



2014-2024 California and WECC Wide Preliminary Natural Gas Use For Electric Generation

Natural Gas Issues, Trends, and Forecast Scenarios Workshop

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Scope of Analysis

- Fuel use for electric generation is a major driver of total natural gas demand
- Develop electricity resource plans and demand scenarios based on policy programs
- Production cost model (PLEXOS) simulations to estimate CA & WECC natural gas demand for generation forecasts through 2024
- Includes existing and future power plants, demand and supply profiles throughout the WECC
- **Not** an operating flexibility analysis of potential natural gas need



Key Drivers Affecting Simulation Results

- Preliminary demand projections (Preliminary CED 2013 Demand Forms posted June 2013)
- Incremental uncommitted energy efficiency (IUEE) program projections (CED 2011 for IOUs and CED 2009 for POUs)
- Combined Heat & Power (CHP) development goals from the ICF Market Assessment Report revised June 2012



Key Drivers Affecting Simulation Results

- Renewable Portfolios based on the joint CEC/CPUC commercial interest portfolio presented December 2012 and adjusted for Preliminary CED 2013 Retail Sales
- Once-Through Cooling (OTC) plant retirements based on latest SWRCB compliance schedules
San Onofre retired
- Announced termination of coal generation contracts
- Natural gas generation fleet efficiency improvements



Key Electric Generation Drivers By Case

- Mid Demand Case – Net demand equals the Preliminary CED 2013 Demand less Mid IUEE from CED 2011 for the IOUs and CED 2009 Mid IUEE for the POUs and less the IEPR 2012 update Medium Case on-site CHP
- High Demand Case - Net demand equals the Preliminary CED 2013 Demand less Low IUEE and less the Base Case on-site CHP
- Low Demand Case – Net demand equals the Preliminary CED 2013 Demand less High IUEE and less the High Case on-site CHP

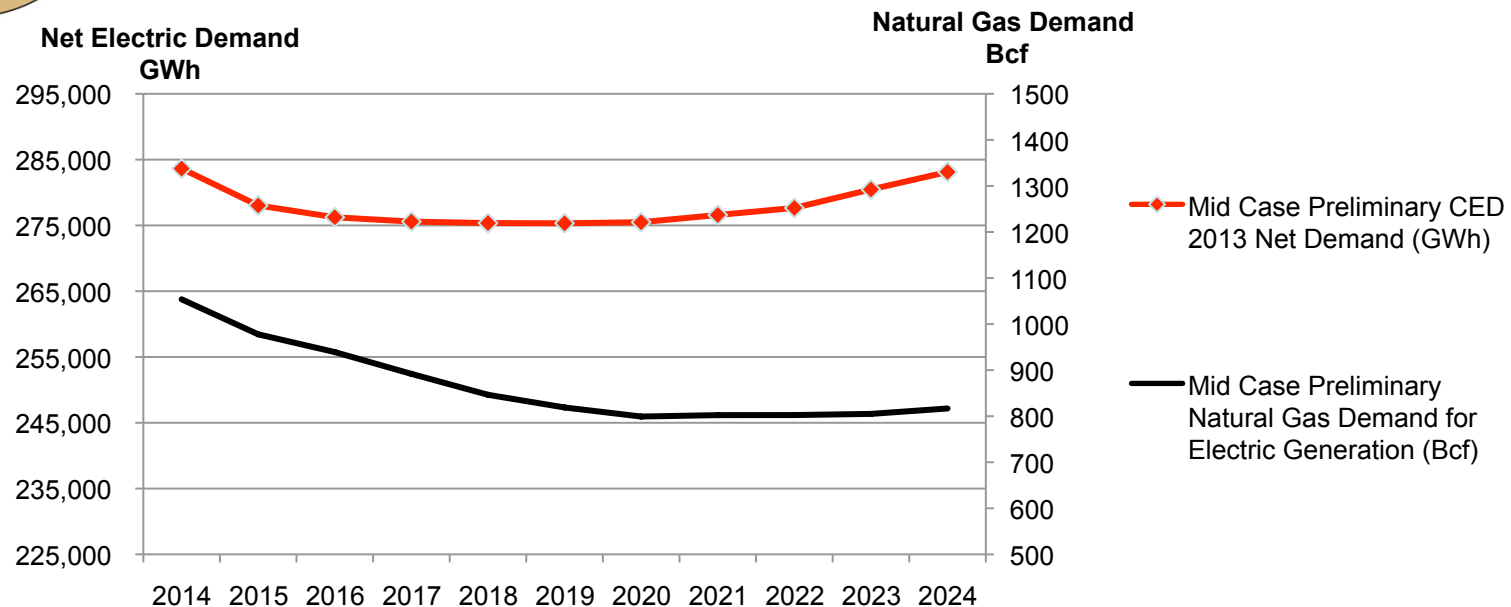


Key Electric Generation Drivers By Case

- California Policy Case - Net demand equals the Preliminary CED 2013 Low Demand less **High** IUEE and less **High** Case on-site CHP. Other WECC states delay full RPS by three years
- Natural Gas/Electric Case - Net demand equals Preliminary CED 2013 Demand **ZERO** IUEE but less the Medium Case on-site CHP. California reaches 40% RPS by 2025. Additional coal plants convert to natural gas
- Low Innovation Case – Net demand equals Preliminary CED 2013 Demand **ZERO** IUEE but less Medium Case on-site CHP.



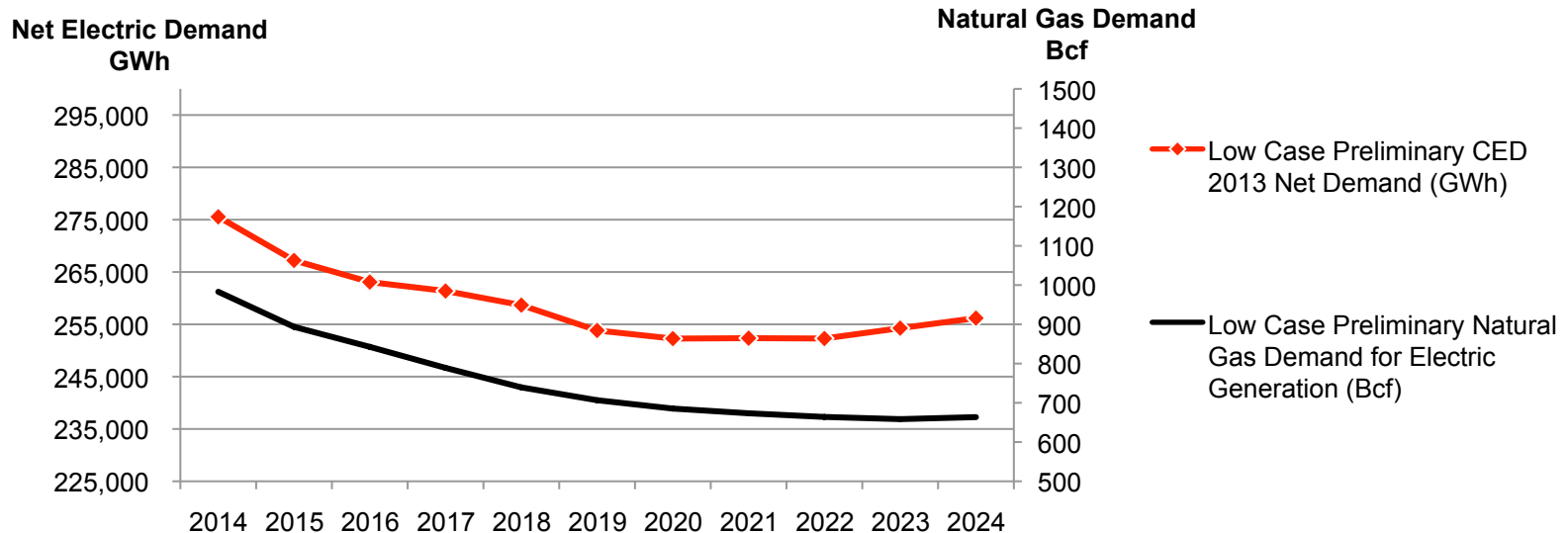
Mid Demand Case - California Electricity Demand and Natural Gas Demand For Electric Generation



- Mid Case IUEE and new on-site CHP create negative load growth in early part of forecast period
- Larger growth in renewable generation projected earlier in forecast period due to investment tax credit expiration by 2017
- -2.5% average annual (2014-2024) decline in natural gas demand for electric generation



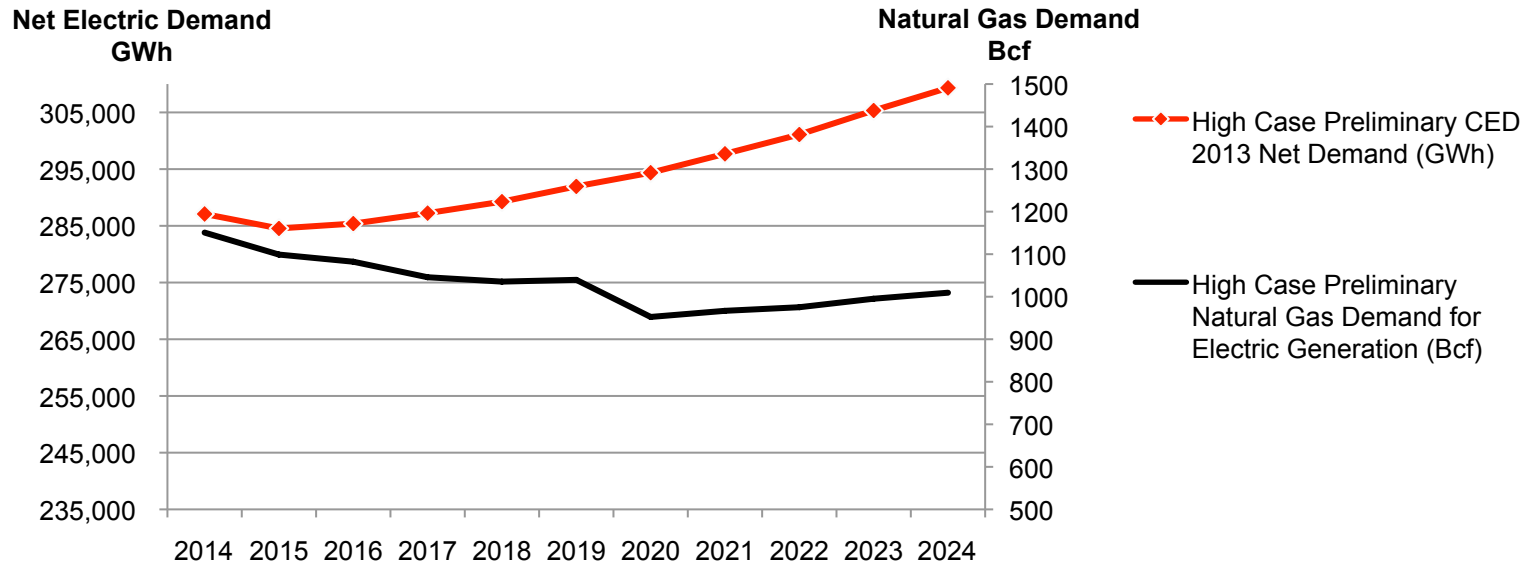
Low Demand Case - California Electricity Demand and Natural Gas Demand For Electric Generation



- Low Demand Case - the **highest** levels of demand reducing IUEE and new on-site CHP - create negative load growth in early part of forecast period
- Growth in renewable generation lower than the Mid Demand Case, but still projected earlier in forecast period due to investment tax credit expiration by 2017
- -3.9% average annual (2014-2024) decline in natural gas demand for electric generation



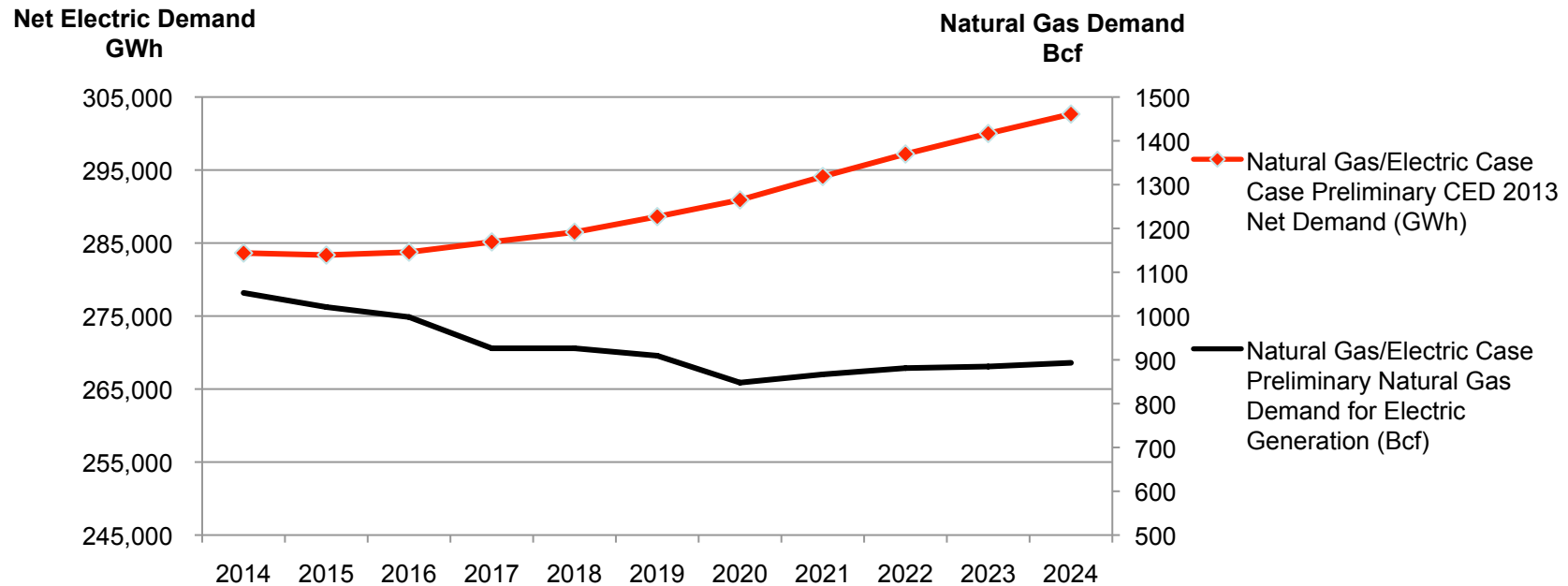
High Demand Case - California Electricity Demand and Natural Gas Demand For Electric Generation



- High Demand Case the **lowest** levels of IUEE and new on-site CHP create only a slight decline in load growth in early part of forecast period
- Growth in renewable generation higher than the Mid Demand Case
- -1.3% average annual (2014-2024) decline in natural gas demand for electric generation



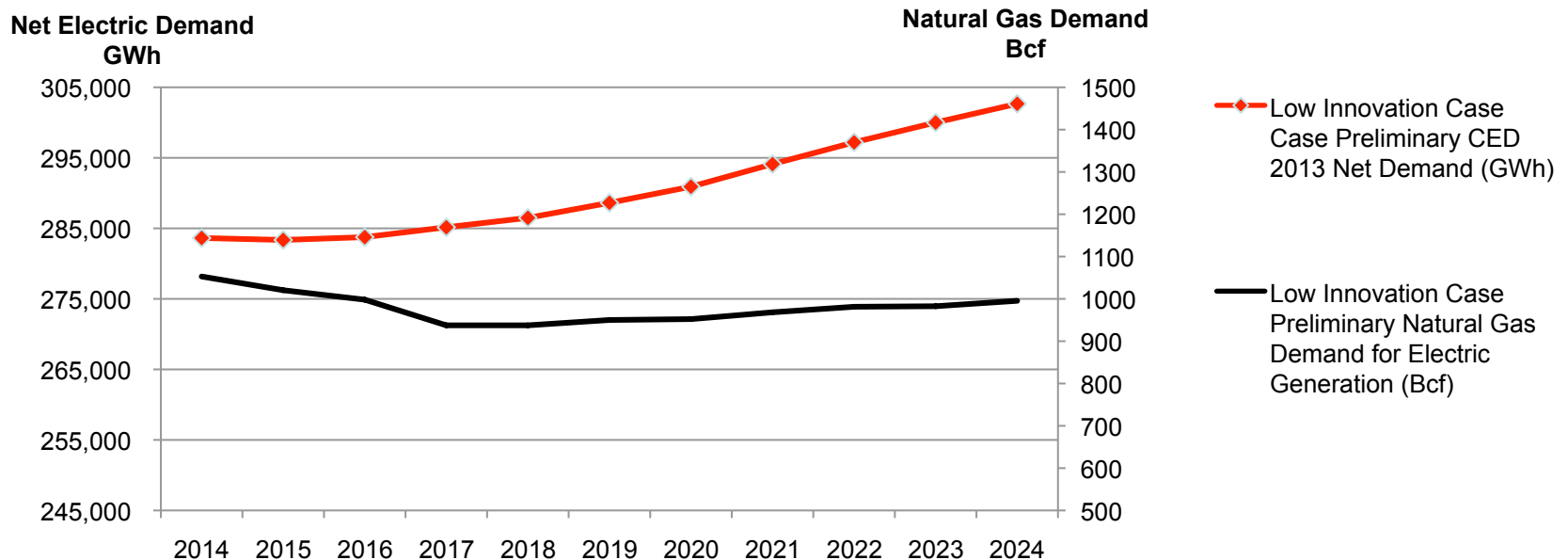
Natural Gas/Electric Case - California Electricity Demand and Natural Gas Demand For Electric Generation



- Mid Case Demand with zero IUEE assumed in CA with Mid Case new on-site CHP - cause flat load growth in early part of forecast period
- Assumes California reaches 39% RPS by 2024
- -1.6% average annual (2014-2024) decline in natural gas demand for electric generation



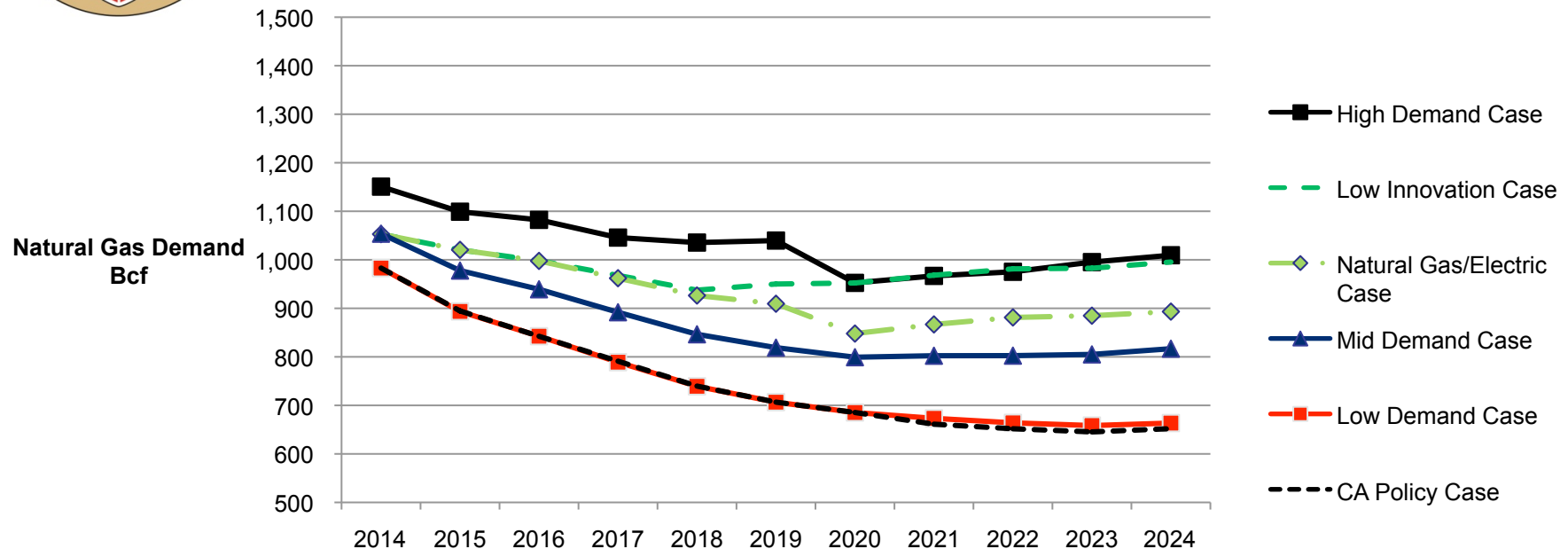
Low Innovation - California Electricity Demand and Natural Gas Demand For Electric Generation



- Mid Case Demand with zero IUEE assumed in CA and Mid Case new on-site CHP create no load growth in early part of forecast period
- Slight increase in renewable energy due to zero IUEE
- -0.6% average annual (2014-2024) decline in natural gas demand for electric generation



All Cases – California Natural Gas Demand For Electric Generation

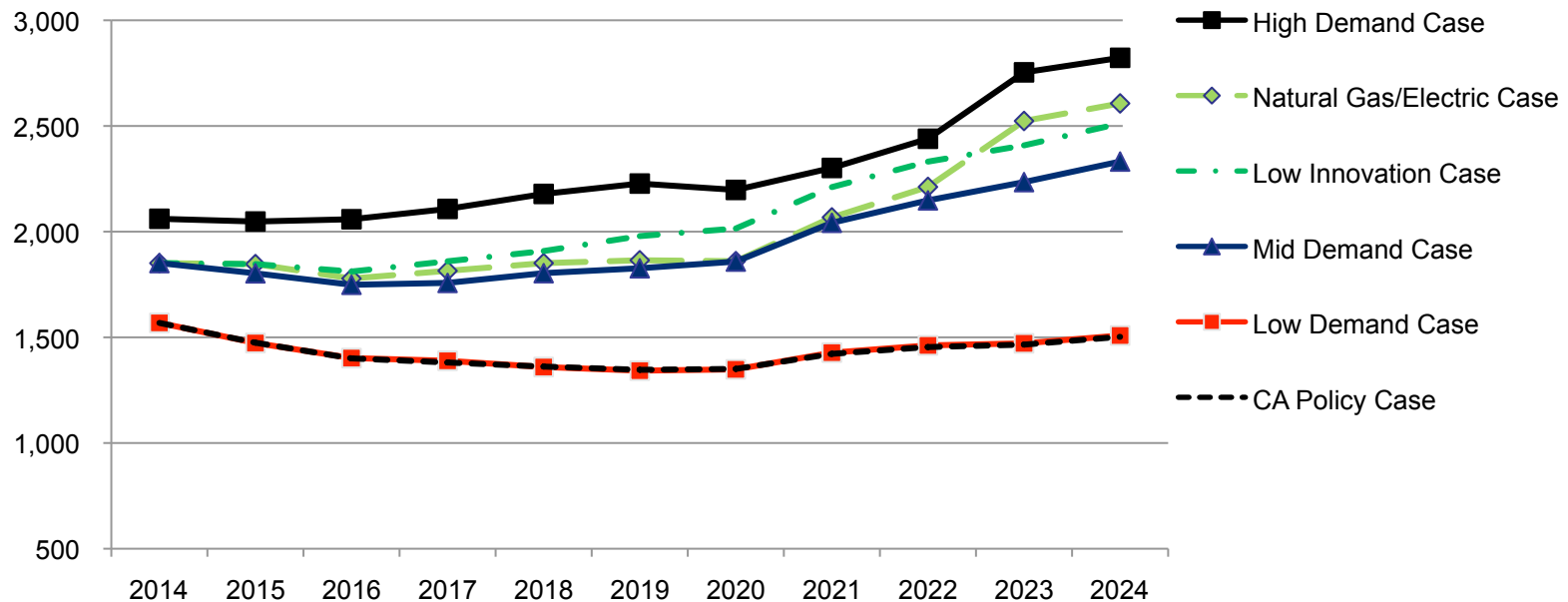


- High Demand and Low Innovation Case natural gas demand converge in California due to consideration of lower and no incremental EE goals, with similar levels of renewables in the Low Innovation Case and High Demand Case
- Natural Gas/ Electric and Low Innovation Case diverge by CA RPS assumptions (Natural Gas/Electric 40% RPS by 2025)



All Cases – WECC Wide Natural Gas Demand For Electric Generation

Natural Gas Demand Bcf



- Natural Gas/Electric and High Demand Cases increase in natural gas demand at the end of the forecast period is driven by the assumed coal plant conversions to natural gas at San Juan (3-4), Navajo (1-3), Intermountain (1-2) and Boardman (biomass)
- 3.5% to (-0.4%) average annual (2014-2024) range of natural gas demand for electric generation, with the at Mid Case 2.3%.



Next Steps

- Update electricity system simulations with final demand forecast including IUEE
- Consider variations of CHP penetration scenarios
- Follow the CAISO operating flexibility studies and studies evaluating potential need for replacement of San Onofre
- Compare and coordinate with CAISO, other California natural gas and electric utilities and WECC staff running similar electric simulation studies